113.

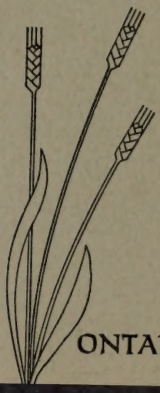
SAFFORD ROUND WATER BOILERS 1909

FOR WARMING
PRIVATE AND PUBLIC
BUILDINGS, COTTAGES
ETC.

THE
DOMINION RADIATOR COMPANY
LIMITED

Purchased from the Chancellor Richardson Memorial Fund

CANADIANA COLLECTION
QUEEN'S UNIVERSITY AT KINGSTON



ONTARIO CANADA

The EDITH *and* LORNE PIERCE
COLLECTION *of* CANADIANA

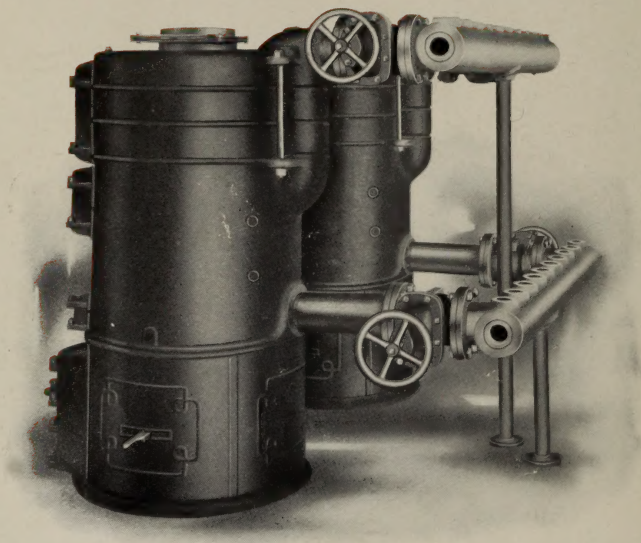
Queen's University at Kingston

Safford Round Water Boilers

FOR WARMING
PRIVATE AND PUBLIC
BUILDINGS, COTTAGES
ETC.

Made in 16 Sizes with Capacities from 235 to 2,250 Square feet of Surface

1905



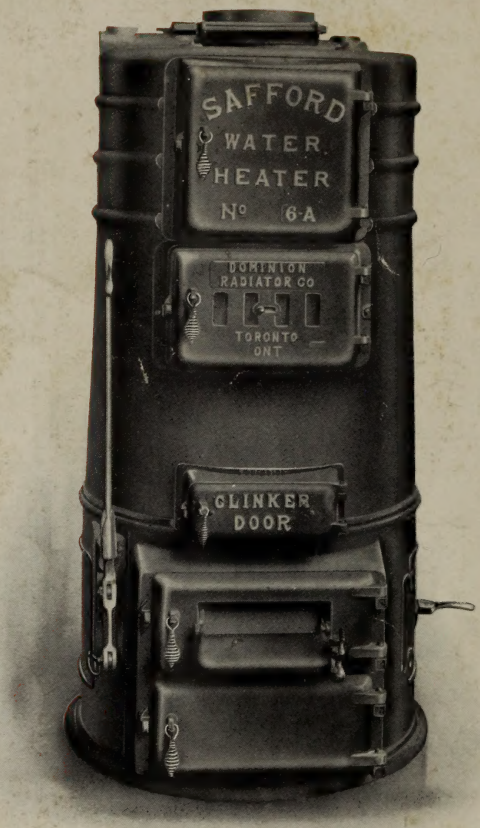
Rear View of Two No. 6A High Base Boilers,
showing twin connections and valves.

1909 Series

IN designing these improved water Boilers expert attention has been directed towards securing the highest efficiency with the least possible consumption of fuel. The firepot section is therefore constructed with sufficient coal capacity to insure full and rapid passage of heat to the water circulation for long continued periods of time. The design throughout is of a simple character, all superfluous features, which add to the weight without increasing effectiveness, being eliminated. The firepot and sections are specially strengthened, and are constructed with a mechanically accurate metal line. Special care is taken in the manufacturing department, the workmanship being of the highest possible character, and all castings are made from the very best grades of iron obtainable. Under ordinary conditions and with reasonable care these boilers will withstand for years the effect of use and deterioration.

These Boilers have been subjected to careful tests and their rated capacities are conservative. As they are low in construction they can be erected in low cellars without sinking pits in the cellar bottom in which to erect them.

Each Boiler is made up of base, fire-pot, intermediate sections and a dome or top section complete, in three sizes with a given diameter of grate. This line of Boilers is made in eight different diameters of grate with a corresponding increase of fire and flue surface. Each of these



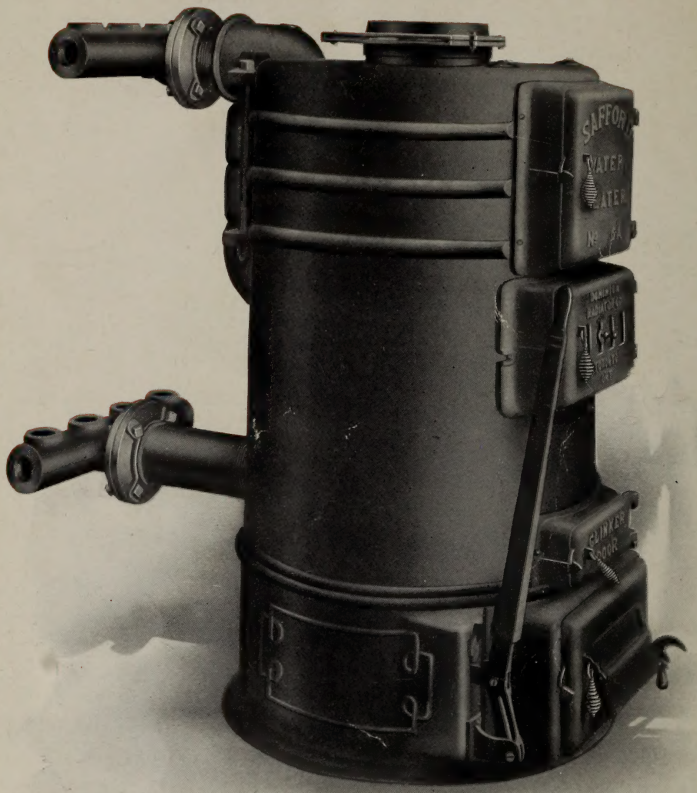
Front View of the No. 6A High Base Boiler

eight typical grate sizes is made up into two Boilers, having three and four sections respectively, making sixteen complete Boilers ranging in capacity from 235 to 2,250 feet of surface.

Fire-Pot Showing Top Crown

Fire-Pot and Fuel Economy

The fire-pot is cast solid with top crown waterways which conduct the water ascending the sides of the pot directly over the most intense heat and to the rear outlet of the upper portion of the pot. From this point the water in part ascends directly to the mains and radiation, and a portion passes through the rear column outlet to the next section where the process of divided circulation is repeated. The fire-pot is corrugated all the way around the interior. These corruga-



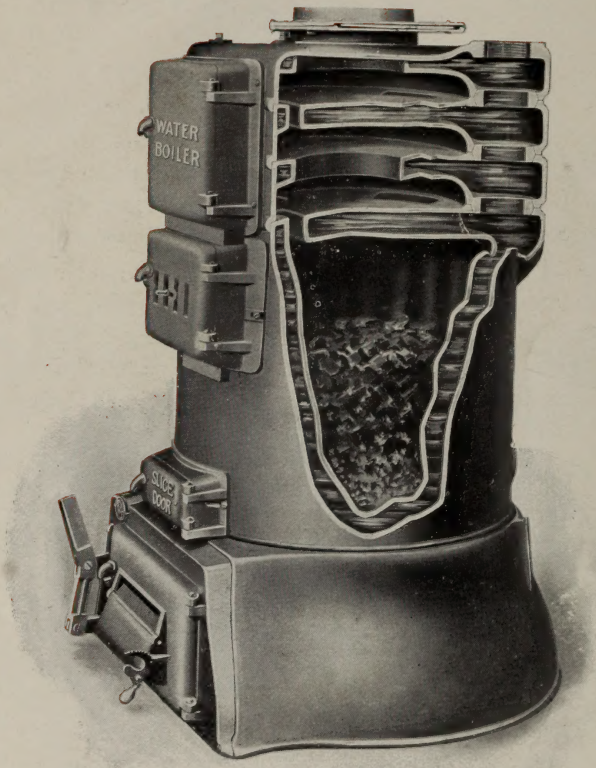
Side View of the No. 6A Low Base Boiler

tions increase the live heating surface about one-third more than the ordinary plain surface offers and provide ample space for air draft up the inner side of the pot, thus insuring a better state of combustion at points where the fire would ordinarily become lifeless, and passing more heat to the water.

A large body of coal under slow combustion produces the best results with the least waste. The extra depth of the fire-pot affords the ample fuel storage space necessary and produces economy of fuel in the highest degree, calling for the least attention to the firing. The crown sheet or under side of top of the fire-pot is of just sufficient height above the fuel (when the fire-pot is carried full) to promote proper union of the gases, thereby securing proper combustion within the chamber of the Boiler.

Combustion and Water Circulation

Views of the two types of sections used in the construction of this Boiler are here shown. The products of combustion are drawn from the fire-pot chamber upward through the three flues of the top crown of the fire-pot and then inward through the centre hole of the first section, and so on through all the sections to the smoke outlet. This staggered passage brings the heated smoke and gases into intimate connection with all the water passing through the sections. The water
the sections through the extended column
the rear of the fire-pot and a large



Sectional View, showing the Deep Firepot, Fire Surfaces and Water Circulation.

body of water is carried around one side of the section and back through the other side to the rear column connection, through which it rises to the next section, where the process is repeated.

The circulation in this Boiler is free, rapid and very effective, for the water as soon as heated in any part at once rises to the outlets and radiation.

Flues and Cleaning

The flues through the sections are large and may be properly termed "self-cleaning." The flue spaces between the sections are wide, and ready access is given to them through a large flue door, so that the entire Boiler may be thoroughly cleaned in a few minutes. As a quarter-

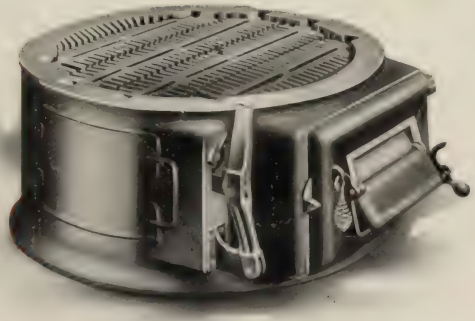
Front View of No. 6A Low Base Boiler

inch of soot deposit may rob the Boiler of about one-third of its heat transmitting power, it will

be readily seen that this feature adds much to the excellent qualities of this Water Boiler.

Base, Grate and Clinker Door

The ash pit base is ample and provided with a large door for taking out ashes. The grate is



The Low Base

a rocking and dumping grate of excellent design and easily operated by a lever that does not require the caretaker to stoop. The fire-pot is also provided with a slice or anti-clinker door at the grate line, so that during certain weather conditions when it is not desirable to shake the grate, a slice bar may be utilized through this door to advantage.

Ash-Sifting Base

For the convenience of those who desire to avoid the dust and annoyance of the old-fashioned operation of "sifting the ashes," we have provided

The High or Ash-Sifting Base
(This Base will be furnished only when specially ordered.)

a special ash-sifting base fitted with an improved type of sifting grate which permits of the com-

plete separation of the ashes from the cinders with the least possible amount of labor.

Tests and Ease of Handling

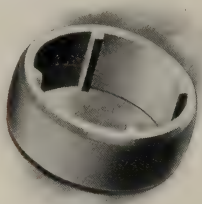
Each sectional part of this Boiler is tested by a cold water test of 80 pounds to the square inch, and before the Boiler is shipped from factory it is assembled and a second test applied of 80 pounds to the square inch. A thorough inspection is given to all castings, so that every practical precaution is exercised to avoid defects and to make the Boiler satisfactory to the dealer and to his customer.

The sectional parts of this Boiler are of such dimensions as to be easily handled and carried through doorways or windows into basements. Owing to the ease with which the slip nipple joint can be made up, the parts of the Boiler can be assembled and connected complete ready for the piping in a few hours' time.

Connections

The sections comprising these Boilers are connected together by the easiest and most perfect water joint known in mechanics, namely, our machine turned iron-to-iron joint, made with cast iron push nipples fitting accurately with the milled or reamed openings of the sections. *Only three to four joints (according to size of Boiler), the minimum number possible.* This method insures a permanently water-tight joint which has been

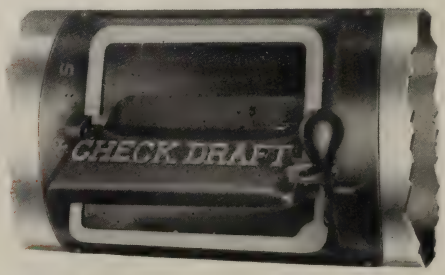
proven to be far superior to the ordinary gasket or packed joints.



The Push Nipple

Smoke Pipe Check Damper

With a view to securing the greatest possible economy in fuel burning all Safford Boilers are provided with check-draft dampers, which should be placed on smoke-pipe near Boiler. By setting this damper in right position the rate of combustion is controlled, loss of heat up the chimney is avoided, the fire is regulated for either mild or severe weather, and the cooling effect on water sections of the smoke-hood type check damper positively overcome.



Safford Round Water Boilers—List Prices and Data

No.	Capacity Cast Iron Radiation, Mains, Returns, etc., not included Sq. ft.	Capacity Lineal Feet One Inch Pipe, Mains, Returns, etc., not included	List Price Low Base	List Price High Base	Height to Top of Outlets on Headers Low Base Inches	Height to Top of Outlets on Headers High Base Inches	Diameter of Grate Inches	Diameter of Smoke-pipe Inches	Flow and Return Outlets on Boilers Inches	Flow and Return Outlets on Headers Inches	Size of Coal
1 -A	235	700	$105.00	$111.00	45 3/8	51 5/8	15	7	3	4—2	Stove
1 1/2-A	270	800	125.00	131.00	49 5/8	55 7/8	15	7	3	4—2	Stove
2 -A	335	1000	140.00	147.00	50 5/8	57 1/8	17	7	3	4—2	Stove
2 1/2-A	400	1200	150.00	157.00	54 7/8	61 3/8	17	7	3	4—2	Stove
3 -A	500	1500	160.00	170.00	51 7/8	58 3/8	19	8	3	4—2	Stove
3 1/2-A	570	1700	180.00	190.00	55 3/4	62 1/4	19	8	3	4—2	Stove
4 -A	670	2000	200.00	215.00	54 3/8	61 1/2	22	9	4	4—2	Stove
4 1/2-A	750	2250	220.00	235.00	59 1/8	66 1/4	22	9	4	4—2	Stove
5 -A	835	2500	240.00	260.00	55 7/8	63 1/4	25	10	4	6—2	Stove or
5 1/2-A	935	2800	260.00	280.00	60 1/4	67 5/8	25	10	4	6—2	Egg
6 -A	1000	3000	270.00	290.00	58 3/8	66 3/8	28	11	5	6—2	Egg
6 1/2-A	1250	3750	335.00	360.00	63 1/2	71 1/2	28	11	5	6—2	Egg
7 -A	1500	4500	392.00	420.00	60 1/4	68 1/4	31	12	5	8—2	Egg
1/2-A	1750	5250	425.00	453.00	65 5/8	73 5/8	31	12	5	8—2	Egg
-A	2000	6000	475.00	505.00	62 3/8	70 3/8	34	13	6	10—2	Egg
8 1/2-A	2250	6750	525.00	555.00	68 5/8	76 5/8	34	13	6	10—2	Egg

For installations requiring larger boiler capacity we recommend the use of Safford Sectional Boilers, as round Boilers having larger grate areas than above are difficult to operate, and show a lower ratio of efficiency in proportion to coal consumed.

See special note on Ratings, page 20.

Additional measurements, pages 18 and 19.

DOMESTIC WATER HEATERS

	No. 1-A to 3 1/2-A	No. 4-A to 6-A	No. 6 1/2A and larger
List price	$2.00	$3.75	$4.80

Twin, Triple and Quadruple Connections
Price List and Data

No.	Twin			Triple			Quadruple		
	List Price including Valves	Inside Diameter of Headers	Number and Size of Valves	List Price including Valves	Inside Diameter of Headers	Number and Size of Valves	List Price including Valves	Inside Diameter of Headers	Number and Size of Valves
2 -A to 3½-A	$110.00	4 in.	4—3 in.	$160.00	5 in.	6—3 in.	$220.00	6 in.	8—3 in.
4 -A to 4½-A	110.00	4 in.	4—4 in.	160.00	5 in.	6—4 in.	220.00	6 in.	8—4 in.
5 -A to 5½-A	135.00	5 in.	4—4 in.	200.00	6 in.	6—4 in.	270.00	7 in.	8—4 in.
6 -A	135.00	6 in.	4—5 in.	200.00	7 in.	6—5 in.	270.00	7 in.	8—5 in.
6½-A	175.00	6 in.	4—5 in.	250.00	7 in.	6—5 in.	350.00	8 in.	8—5 in.
7 -A to 7½-A	190.00	6 in.	4—5 in.	300.00	8 in.	6—5 in.	380.00	8 in.	8—5 in.
8 -A to 8½-A	230.00	8 in.	4—6 in.	350.00	8 in.	6—6 in.	460.00	10 in.	8—6 in.

No allowance will be made for ordinary headers.

ALLOWANCE FOR VALVES WHEN NOT REQUIRED.

Nos. 2-A to 3½-A.....$4.00 each net
" 4-A to 4½-A..... 4.00 each net
" 5-A to 6 -A..... 5.00 each net
No. 6½-A.....$5.75 each net
Nos. 7 -A to 7½-A..... 6.25 each net
" 8 -A to 8½-A..... 7.50 each net

All Twin, Triple and Quadruple connections for Safford Boilers will be furnished with any number of openings that may be desired. Orders should be accompanied by drawings or sketches showing number and size of openings and the position in which they are required to be placed.

All Dome Sections for Safford Boilers are provided with special openings for relief pipes, which should be carried over expansion tank to prevent accident in the event of valves being closed when Boilers are in operation.

Detail Measurements of Twin Connections for Safford Boilers

No.	Inside Dia. of Headers Inches	Length of Flow Header Inches	Length of Return Header Inches	Size of Flanged Inlet Inches	Distance Centre to Centre of Flanges Inches	Number of Outlets Inches	Distance Between Boiler Bases Inches	Space Occupied Width Inches	Space Occupied Depth Inches
2 -A	4	51 5/8	46 5/8	3x7 1/2	34 1/4	8—2	11 3/8	57 1/8	49
2 1/2 -A	4	51 5/8	46 5/8	3x7 1/2	34 1/4	8—2	11 3/8	57 1/8	49
3 -A	4	51 5/8	46 5/8	3x7 1/2	34 1/4	8—2	9	59 1/2	51 1/4
3 1/2 -A	4	51 5/8	46 5/8	3x7 1/2	34 1/4	8—2	9	59 1/2	51 1/4
4 -A	4	51 5/8	46 5/8	4x9	37 3/8	8—2	9	65 3/4	58 1/4
4 1/2 -A	4	51 5/8	46 5/8	4x9	37 3/8	8—2	9	65 3/4	58 1/4
5 -A	5	55 5/8	55 5/8	4x9	42	10—2	10 1/2	73 1/2	63 3/8
5 1/2 -A	5	55 5/8	55 5/8	4x9	42	10—2	10 1/2	73 1/2	63 3/8
6 -A	6	71 7/8	65 3/8	5x10	46 1/2	12—2	12 1/8	81	69 1/8
6 1/2 -A	6	71 7/8	65 3/8	5x10	46 1/2	12—2	12 1/8	81	69 1/8
7 -A	6	96	96	5x10	49 1/2	16—2	12 1/8	87	72 1/8
7 1/2 -A	6	96	96	5x10	49 1/2	16—2	12 1/8	87	72 1/8
8 -A	8	122	122	6x11	52 3/4	20—2	12 1/8	93 1/4	81 1/2
8 1/2 -A	8	122	122	6x11	52 3/4	20—2	12 1/8	93 1/4	81 1/2

Measurements—Low Base Boilers

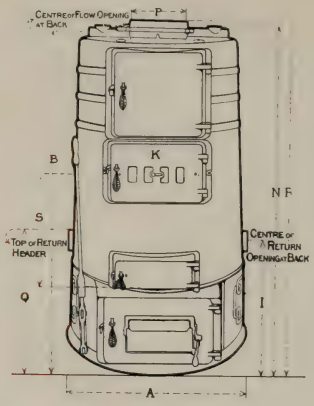


Table of distances between points as outlined on skeleton sketch of Boiler shown above. These measurements are given in inches.

No.	A.	N.	Q.	B.	I.	K.	P.	R.	S.
1 -A	21 1/4	45 3/8	17 3/4	43 1/8	15 1/2	8 3/8 x 10 3/4	7	46 1/4	20
1 1/2 -A	21 1/4	49 5/8	17 3/4	47 3/8	15 1/2	8 3/8 x 10 3/4	7	50 1/4	20
2 -A	22 7/8	50 5/8	18 1/8	48 3/8	15 7/8	8 5/8 x 11 3/4	7	51 3/4	18 7/16
2 1/2 -A	22 7/8	54 7/8	18 1/8	52 5/8	15 7/8	8 5/8 x 11 3/4	7	55 3/4	18 7/16
3 -A	25 1/4	57 7/8	18 3/8	49 5/8	16 1/8	8 5/8 x 11 3/4	8	52 3/4	18 15/16
3 1/2 -A	25 1/4	55 3/4	18 3/8	53 1/2	16 1/8	8 5/8 x 11 3/4	8	56 3/4	18 15/16
4 -A	28 3/8	54 3/8	19 1/8	52	16 3/4	9 1/4 x 13 1/4	9	55 1/4	19 1/2
4 1/2 -A	28 3/8	59 1/8	19 1/8	56 3/4	16 3/4	9 1/4 x 13 1/4	9	59 3/4	19 1/2
5 -A	31 1/2	55 7/8	19 5/8	53 1/4	17	9 1/4 x 13 1/4	10	56 1/2	20 1/8
5 1/2 -A	31 1/2	60 1/4	19 5/8	57 5/8	17	9 1/4 x 13 1/4	10	61	20 1/8
6 -A	34 3/8	58 3/8	20 1/8	55 5/8	17 3/8	9 1/2 x 16	11	59 1/4	20 5/8
6 1/2 -A	34 3/8	63 1/2	20 1/8	60 3/4	17 3/8	9 1/2 x 16	11	64 1/4	20 5/8
7 -A	37 3/8	60 1/4	20 7/8	57 3/8	18	9 1/2 x 16	12	60 5/8	21 5/8
7 1/2 -A	37 3/8	65 5/8	20 7/8	62 3/4	18	9 1/2 x 16	12	65 5/8	21 5/8
8 -A	40 5/8	62 3/8	22 3/8	59 1/4	19 1/4	9 1/2 x 16	13	62	22 1/4
8 1/2 -A	40 5/8	68 5/8	22 3/8	65 1/2	19 1/4	9 1/2 x 16	13	67	22 1/4

Measurements—High Base Boilers

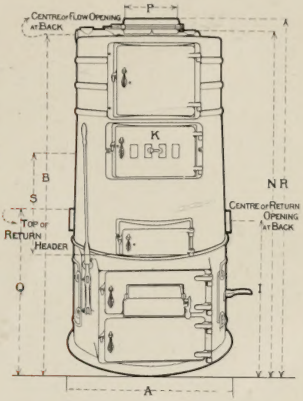


Table of distances between points as outlined on skeleton sketch of Boiler shown above. These measurements are given in inches.

No.	A.	N.	Q.	B.	I.	K.	P.	R.	S.
1 -A	21 1/4	51 5/8	24	49 3/8	21 3/4	8 3/8 x 10 3/4	7	52 1/2	20
1 1/2 -A	21 1/4	55 7/8	24	53 5/8	21 3/4	8 3/8 x 10 3/4	7	56 1/2	20
2 -A	22 7/8	57 1/8	24 5/8	54 7/8	22 3/8	8 5/8 x 11 3/4	7	58 1/4	18 7/16
2 1/2 -A	22 7/8	61 3/8	24 5/8	59 1/8	22 3/8	8 5/8 x 11 3/4	7	62 3/4	18 7/16
3 -A	25 1/4	58 3/8	24 7/8	56 1/8	22 5/8	8 5/8 x 11 3/4	8	59 1/4	18 15/16
3 1/2 -A	25 1/4	62 1/4	24 7/8	60	22 5/8	8 5/8 x 11 3/4	8	63 1/4	18 15/16
4 -A	28 3/8	61 1/2	26 1/4	59 1/8	23 7/8	9 1/4 x 13 1/4	9	62 3/8	19 1/2
4 1/2 -A	28 3/8	66 1/4	26 1/4	63 7/8	23 7/8	9 1/4 x 13 1/4	9	66 7/8	19 1/2
5 -A	31 1/2	63 1/4	27	60 5/8	24 3/8	9 1/4 x 13 1/4	10	63 7/8	20 1/8
5 1/2 -A	31 1/2	67 5/8	27	65	24 3/8	9 1/4 x 13 1/4	10	68 3/8	20 1/8
6 -A	34 3/8	66 3/8	28 1/8	63 5/8	25 3/8	9 1/2 x 16	11	67 1/4	20 5/8
6 1/2 -A	34 3/8	71 1/2	28 1/8	68 3/4	25 3/8	9 1/2 x 16	11	72 1/4	20 5/8
7 -A	37 3/8	68 1/4	28 7/8	65 3/8	26	9 1/2 x 16	12	68 5/8	21 5/8
7 1/2 -A	37 3/8	73 5/8	28 7/8	70 3/4	26	9 1/2 x 16	12	73 5/8	21 5/8
8 -A	40 5/8	70 3/8	30 3/8	67 1/4	27 1/4	9 1/2 x 16	13	70	22 1/4
8 1/2 -A	40 5/8	76 5/8	30 3/8	73 1/2	27 1/4	9 1/2 x 16	13	75	22 1/4

Note: Boiler Data

RATINGS.—The ratings on Safford Boilers are based on their capacity to maintain a temperature of 170 degrees in the water in the Radiator throughout a period of eight hours on one firing. It is of course assumed that sufficient radiating surface has been allowed in the various rooms to maintain a temperature of 70 degrees Fahrenheit during zero weather. Under more severe climatic conditions a reasonable allowance should be made to provide for the additional tax imposed on the Boiler. A liberal allowance has been made for mains, returns, risers, etc., so that the ratings shown indicate the actual capacity of these Boilers in direct radiation.

When indirect radiation is to be used not less than 75 per cent. increase over direct radiation should be figured in determining size of Boiler required.

RECOMMENDATIONS.—Both on account of increased efficiency and in the interest of greater economy, we strongly recommend that all Boilers be thoroughly protected by a substantial covering of asbestos.

Boiler Covering

The following table shows amount of Asbestos Boiler Covering required to cover 1¼ inch thick the various sizes of Safford Boilers.

No. of Boiler	Pounds	No. of Boiler	Pounds
1 -A	90	5½-A and 6-A	200
1½-A	110	6½-A and 7-A	250
2 -A	100	7½	300
2½-A and 3-A	125	8	325
3½-A and 4-A	150	8½	375
4½-A and 5-A	175		

THE

DOMINION RADIATOR COMPANY

LIMITED

GENERAL OFFICES

DUFFERIN AND VAN HORNE STREETS

TORONTO ONTARIO

BRANCHES

68-80 VICTORIA STREET WINNIPEG, MAN.

144-6 CRAIG STREET WEST MONTREAL, QUE.

56 UNION STREET ST. JOHN, N. B.